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EDITORIAL



THE FEDERAL COUNCILLOR

The dawn of April, 1953, heralds the approach of yet another Federal Convention and brings to the fore questions relative to "the Federal Councillor," his duties and value to the Institute.

Federal Executive, by virtue of regular correspondence, keeps your Federal Councillor fully informed regarding developments in the relationship of the Institute's activities to those of other Societies and Government Departments. The Federal Councillor then assumes the responsibility of keeping the members of his Division abreast of the news by reporting at General Meetings, Council Meetings and Divisional Conventions.

The Federal Councillor is responsible for conveying to Federal Council through Federal Executive the wishes of his Divisional Council and members, in order that a vote of Federal Council may be taken on any matter whatsoever during the course of the year.

The Federal Councillor is the guardian of Federal Policy and as such must be on the alert to see that any action contemplated within his own Division is in accordance with that policy.

Members of the Institute should insist that a full report of Federal activity be given at every General Meeting, and show interest in Federal affairs by the attention given to the Federal Councillor. Furthermore, members should submit to the Federal Councillors matters which, as individuals, they consider warrant Federal action. The conscientious Federal Councillor will submit these matters to his Divisional Council without delay. The Council, in its wisdom, will decide whether the matter is suitable for forwarding to Federal Executive for action; if not, it will convey to the member concerned its decision and give him an acceptable explanation.

Remember! Your Federal Councillor can obtain immediately the vote of Federal Council on any matter throughout the year; therefore only matters of such high policy as to merit personal debate need be placed on an agenda for a Federal Convention.

Get to know your Federal Councillor better—give him work to do—request information at every opportunity—in other words, let him enjoy the status his position merits—let him earn his spurs.

FEDERAL EXECUTIVE

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Carrier Control With Self-Biased Clamp Tube Modulator*

One of the current mobile modulation schemes is the circuit shown in Fig. 1. Whatever the original idea behind the use of the selenium rectifier, a check of the system shows that its effect is to provide a means of obtaining a certain amount of carrier control. As pointed out previously, I_c carrier control increases the permissible peak input to the modulated amplifier without exceeding either the capacity of the power supply or the modulated amplifier's rated dissipation, as averaged over a period of voice transmission, by reducing the duty cycle. The rectifier provides the modulator with a d.c. bias that varies with the average of the audio input level. As the audio level increases, the bias on the modulator likewise increases. As the current through the modulator drops, the voltage drop through the modulator plate resistor, R2. This allows the average or d.c. voltage of the screen of the r.f. amplifier to rise, and so the carrier level rises.

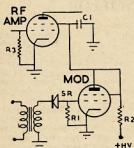


Fig. 1.—Controlled-carrier circuit for clamp tube modulation. A selenium rectifier is used in the grid circuit of the modulator tube. R1 in this instance is 7 megohm. R2 is the modulator plate load resistor. C1 and R3 are the usual r.f. amplifier screen by-pass and grid leak, respectively.

The circuit of Fig. 1 was set up using a pair of 6AQ5s and a suitable driver for the r.f. amplifier. The r.f. amplifier was adjusted and loaded to show satisfactory linearity by checking the trapezoidal pattern on a 'scope. With essentially sinewave audio input and the level set just below the point where the positive or upward peaks of modulation started to flatten noticeably, the envelope pattern of these peaks obtained is shown in Fig. 2. The flattening observed at the top of these peaks occurs in this instance when the negative peaks of the audio signal have sufficient amplitude to cut off modulator plate current.)

Under these conditions, and with a supply voltage of 500, the r.f. amplified cathode current was about 45 Ma. With no modulation, this current dropped to 22 Ma. However, no matter what the audio level, the pattern showed the same flattening on the negative or downward modulation peaks. This might be expected, of course. With the selenium rectifier in the circuit, the audio at the grid of the modulator is limited

Various opinions are held by Amateurs on the virtues of Clamp Tube Modulation and, as is usual, some are for and some against.

Those of us who have run into difficulty may have done so due to insufficient knowledge of the factors involved, or due to improper adjustment.

To cover the subject fully we are reprinting an article from "QST" Technical Topics and following with the description of a Mobile Modulator by G. M. Bowen (VK5XU).

essentially to the negative half of the audio cycle, the positive half being virtually eliminated by the rectifier.

At this juncture, it might be well to point out that a great deal of confusion seems to exist in the minds of some in interpreting a 'scope pattern of the type shown in Fig. 2. Such a pattern is described as showing 'great peaks of audio descending out of the carrier' which seems to indicate that, in some mysterious way, an unusual amount of sideband power is being generated. Even though all laws of modulation are against it, this idea seems to be confirmed by the way a load lamp (or the antenna current) flashes up when modulation is applied. Perhaps this misconception arises from a hasty comparison with the pattern obtained with a constant-carrier system of the conventional type, such as a properly adjusted clamp type (e.g. such a pattern is shown in Fig. 3. In the latter case, the observer first sees a pattern of the plain carrier before modulation is applied. Therefore, when modulation is applied, it is easy to compare the amplitude of the positive modulation peaks with the carrier level. With controlled carrier, the observer sees a relatively narrow band on the screen before modulation is applied. The mistake no doubt occurs when the same sort of comparison is made between modulated and unmodulated patterns. The fact that the carrier level must increase when modulation is applied in a carrier control system is forgotten or ignored. Just as the carrier is no longer visible in the pattern in Fig. 3, so the carrier level can no longer be seen in Fig. 2. The part of the pattern labelled A in Fig. 2 corresponds to the similarly labelled part of Fig. 3. The fact that Fig. 2 shows flattening at this point, instead of being nicely rounded in sine-wave fashion, as in Fig. 3, merely in-

Fig. 2—Modulation pattern obtained with the circuit of Fig. 1 with sine-wave audio input. The result of clipping of the positive half of the audio cycle by the selenium rectifier is shown by the flat top in the negative direction.



icates serious audio distortion. And the fact that **A** is narrower in Fig. 3 than in Fig. 2 indicates that modulation in the negative direction actually is considerably less in Fig. 2 than in Fig. 3. Without analysing the pattern and determining the true carrier level with **modulation**, it is impossible to know the percentage of modulation in the positive or upward direction.



Fig. 3. — Oscillogram of a properly-adjusted clamp tube rig with about 75% modulation. Comparison with Fig. 2 will give an idea of the distortion represented in the latter.

The approximate carrier level can be determined experimentally with the aid of a scope and receiver S meter. First, take an S meter reading while the signal is being modulated. Then remove the modulator and disconnect the coupling, and the scope, increase the input to the r.f. amplifier until the same S meter reading obtained. The height of the pattern of this unmodulated carrier will then be the effective height of the carrier level on the original pattern. Input to the amplifier can be raised by increasing the supply voltage, preferably by inserting a resistor between the modulator cathode and ground and adjusting its value until the desired S meter reading is obtained. In either case, care should be used not to operate the amplifier under this condition longer than necessary to make the check, since the input will be above normal ratings.

Fig. 4 shows the pattern of a conventional constant-carrier system modulated by the same audio signal which modulated the controlled-carrier signal that produced Fig. 2. The dashed line shows the envelope of the carrier being modulated. It will be seen that the two patterns are identical. With the same input in both cases, the same S meter readings were obtained, showing that both carrier levels were the same. Also, readings of the audio output from the receiver of the two systems were exactly the same, proving that the side-band powers were equal. An analysis of these two patterns (Figs. 2 and 4) shows upward modulation of about 80 per cent, and downward modulation of only about 55 per cent. Disregarding distortion, it is quite apparent that the controlled-carrier system of Fig. 1 is not particularly effective one from the viewpoint of "talk power."

As has been pointed out previously, a high percentage of modulation with screen modulation cannot be expected unless the modulator can swing the screen voltage to zero or beyond into the negative region. This can be done only by the use of a proper transformer

* Reprinted from "QST," November, 1952.

† Technical Topics, "Screen Modulation with Limited Carrier Control," "QST," April, 1951, p.64.

The carrier level can also be determined graphically by drawing a line through the envelope pattern, parallel to the horizontal axis, and at such a height that the area in the light peaks above the line equals the area in the dark valleys below the line.

[†] Technical Topics, "Clamp Tube Modulation," "QST," March, 1950, p.46.



Fig. 4. — 'Scope pattern of a conventional constant carrier system modulated by the same audio signal generated by the circuit of Fig. 1. The dashed line shows the level of the carrier before applying modulation.

between the modulator plate and the r.f. amplifier screen, or by inserting an additional resistor with audio by-pass between the modulator plate and the screen, as shown in Fig. 5. The condenser, C1, tends to hold the d.c. voltage drop across the resistor, R1, constant. Therefore, if the voltage drop across this resistor is made sufficient, the screen voltage may drop to zero or even fall to a potential negative in respect to its cathode when the modulator plate voltage is at its lowest point.

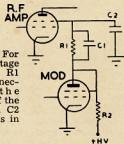


Fig. 5. — For high percentage modulation, R1 and C1 are necessary in the screen lead of the r.f. amplifier. C2 and R2 are as in Fig. 1.

For instance, if the voltage drop across the screen resistor is 100 volts when the modulator plate voltage is 300, then the screen voltage will be $300 - 100 = 200$ volts. Therefore, if the voltage drop across the screen resistor remains the same and the modulator voltage drops to 75 volts, the resulting screen voltage will be $75 - 100 = -25$ volts.



Fig. 6. — Pattern obtained with the circuit of Fig. 1 by adding screen resistor and condenser as shown in Fig. 5. The increase in percentage of downward modulation will be evident by comparing this pattern with the one of Fig. 2.

Fig. 6 shows very clearly the improvement in downward modulation that accompanied this change in circuit. It also serves to make it more obvious that the band at the centre of the pattern cannot be interpreted as representing the carrier under modulation. With 100 per cent. downward modulation, this band would be reduced to a line. The dashed line in Fig. 6 again shows the approximate carrier level. Downward modulation has been increased to about 83 per cent.—just about the limit for screen modulation with good linearity. However, because of the audio wave-shape supplied to the modulator grid circuit through the selenium rectifier, this percentage of modulation in the negative direction cannot be reached without producing more than 100 per

cent. modulation in the upward direction. Over-modulation in the positive direction can be tolerated so long as the r.f. amplifier operation remains linear. In Fig. 6, upward modulation is about 112 per cent.

Fig. 7 shows the pattern obtained with an increase in the audio level. The serious flattening on the positive peaks is the result of driving the modulator grid so far negative that the modulator's plate current is cut off so that the r.f. amplifier screen voltage can no longer rise. Incidentally, this is quite apt to be the adjustment that one would reach by adjusting for maximum kick-up of output under modulation. Experience in this series of tests demonstrates once more the virtual impossibility of proper adjustment of a screen-modulated amplifier without the aid of a 'scope.

Fig. 7. — Pattern obtained from the circuit of Fig. 1 with the additions of Fig. 5 and with the audio level increased to where the positive modulation peaks are clipped when the modulator plate current cuts off.



In pursuing the subject further, the question comes up of why the selenium rectifier should be necessary. The modulator tube in this instance is not provided with fixed bias but, with the insertion of a blocking condenser, as shown in Fig. 8, it should operate as a grid-leak-biased amplifier. Operating in this manner the average bias would ride up and down with the audio level, at a rate depending on the time constant of the condenser and grid resistor. Furthermore, the maximum bias developed should approach the peak value of the maximum amplitude of the applied audio signal. Therefore, if the time constant is made long enough, a bias sufficient for essentially Class A operation of the modulator should be held over from one maximum peak to the next.

Fig. 8. — The substitution of a grid blocking condenser, C1, for the selenium rectifier in the circuit of Fig. 1 reduces distortion without impairing carrier control operation.



On the other hand, it is desirable to make the time constant as short as possible while still approaching the Class A condition, because a short time constant reduces the duty cycle and a great peak input can be used, as mentioned previously. The best time constant is one that allows the carrier to vary at approximately a syllabic rate. A time constant of about 0.25 second has been found to be about right. The values used were a 0.25 μ F. condenser and 1 megohm grid resistor.

In practice, the results do not agree completely with the theory. The reason for this is that the theory holds true only if the impedance of the audio source is low so that its output voltage does not vary appreciably with the

varying load of the modulator grid circuit. A microphone transformer is not such a source and the positive peaks in this circuit will be clipped almost as badly as they were by the selenium rectifier. However, even in this case, comparative checks have shown that there is a reduction in distortion compared with that of the circuit with the rectifier.

A Mobile Modulator

BY G. M. BOWEN,† VK5XU

Ever since I acquired a Type 3 unit it has been my ambition to include the modulator within the case. Numerous attempts with a 6J5 as a series screen modulator were moderately successful and all the components "fitted" into the few odd spaces, but the modulation was not as good as it should have been, even for portable operation. Having the cathode 125 volts above earth always made me uneasy, and I could never get 100 per cent. modulation with only the mike transformer and tube.

Then recently two events occurred that brightened the horizon. Technical Topics in November, 1952, "QST" gave me a lead on clamp tube controlled carrier using self-bias, and I raised the necessary for an Innoval 6M5 pentode. This tube is the answer to the Ham's prayer. It has such a high slope that it literally runs by itself and the ordinary carbon mike input is sufficient to severely overload it. As a triode it is a first class clamp tube for a 6L6 or any equivalent tube like the 807.

A few hours experimenting with the time constant values of C1 and R1 for the delay time of the carrier and I finished up with C1 0.1 μ F. and R1 1 megohm. The screen dropping resistor

(Continued on Page 4)

† 73 Portrush Road, Toorak Gardens, South Aust.



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A MOBILE MODULATOR

(Continued from Page 3)

will need to be adjusted to suit individual requirements, but the value of voltage at the screen should be 100 to 125 volts. In the Type 3 there is a 250 volt screen supply which enables a wire wound resistor to be inserted into the chassis.

SW1 is a single pole double throw toggle which opens the connection to the 6M5 and shorts out the 2,500 ohm screen dropping resistor for tuning purposes or for c.w. operation of the Type 3.

A four-pin miniature speaker plug and socket takes the mike connections, and you will notice that on the circuit shown, the excitation for the mike is taken from the cathode current of the 6L6. On my mike there is a push to talk connection which enables me to open the connection when I push the hand switch. This is a very handy adjunct and enables tuning to be done without having the mike itself closed.

One word of warning. If the mike transformer leads are not connected correctly, the circuit will act as an audio oscillator! Reverse the primary leads to affect a cure.

The Innoval socket solders onto the anode tuning condenser and the tube sits upright between the r.f.c. and the aerial coupling condenser in the Type 3. Remove the cathode by-pass condenser (C23) which carries the earth terminal on the front panel and wrangle the small mike transformer in between the switch bank and the aerial coupling condenser.

The four-pin socket (or a small jack) to take the mike cable can be fitted adjacent to the p.a. grid coils quite easily. The hole from the earth terminal can be enlarged to take the c.w.-phone switch SW1 mentioned previously.

For the Type 3, the tuning procedure is the usual one, but make sure that the clamp tube is not in circuit or you will appear to be tuning for rise of plate current instead of the usual dip. Load the final to the maximum limit as for c.w. operation, then switch in the clamp tube and watch the plate current fall to about half value. Make the usual testing sounds into the mike and note rise of plate current to almost full value which is normal for carrier control. Too much audio will cause the 6M5 to cut off and cause bad distortion, so ease up on the level! Only the negative audio peaks can be passed by the tube when this happens and then only if the C1/R1 combination is sufficiently fast.

The idea is to get enough current still flowing in the 6M5 to swing the voltage

B.C. Converter for the S.W. Receiver

BY LES DUNCAN,* VK5AX

Current interest in crystal controlled converters and a desire to have "music while I work," led the writer to evolve the following novelty one recent wet Sunday afternoon. Most Hams are familiar with the principle of the xtal locked converter by now, so I will not enter into a long technical description. (VK5GGL, "A.R.," November, 1952, has covered the ground thoroughly.)

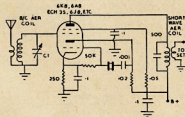
The general idea is to convert a high frequency to a low one within the tuning range of the station receiver. It was reasoned that if this works so well, why not do the opposite—namely convert the broadcast band to a higher frequency and have your favorite serial on the shortwave super?

A quick search through the junk box found a 6050 Kc. crystal, an old pentagrid converter tube and sundry smatterings. Pencil and paper and a few moments of grade VII arithmetic showed that the broadcast band (1,500 to 500 Kc.) would tune from 7,550 to 6,550 Kc. on the shortwave, the writer was proving the soundness of the scheme by listening to the local broadcasts at full volume. The thing worked like a charm and is the easiest of projects to get going, no circuits to juggle with for hours and guaranteed to go from the start.

The accompanying circuit should be self explanatory but a few points may be enlarged upon. The aerial coil is an ordinary broadcast aerial coil. If you live in the country, make C1 a variable so that you can peak the circuit on the weaker stations. If you live in the shadow of the big stations, just put a

* 16 King Street, Gawler, South Australia

couple of hundred pF. across the coil and forget it. The output coil was an ordinary shortwave coil from a dual waver, shunted with 500 pF. to get the resonance somewhere near 7 Mc. An r.f. choke in this position would probably do the same job. That is all there is to it. Any xal will do. Add the frequency to 1,500 Kc. and 500 Kc. and thus determine the tuning range on the receiver dial.



It was not many minutes after the first station appeared on the calculated spot that it was realised the unit had possibilities as a frequency meter. For instance: Broadcast stations are required to maintain their frequency within very close limits and the frequency as read on your receiver dial will be as accurate, plus or minus, as the crystal you use. I may not have phrased that very well but here is an example. 5DN transmits on 970 Kc.; the crystal I use is 6050 Kc., and thus 5DN appears on my dial at 7020 Kc. Catch on? Using a 6150 Kc. rock, which I zero beat to Radio Australia, gives me 5DN at 7120 Kc. plus or minus a few cycles.

Now you take it from there.

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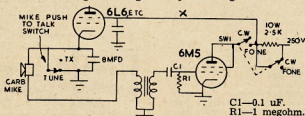
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Values for Type 3, Mark II.

WHY? ...47!

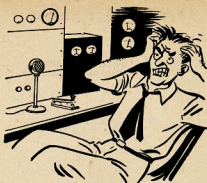
The Reason for the Oddness of Preferred Values

Reprinted from "Wireless World," Feb., 1932

"Diallist" recently disposed of the impression that when a resistor is marked 47,000 ohms it is necessarily something quite different from a 50,000 ohm resistor. As he pointed out, a usual tolerance is $\pm 10\%$, so the "47,000 ohm" resistor would be within its rights if its actual resistance were anything between 42.3K and 51.7K ohms. For most purposes, then, 47 and 50 are interchangeable.

That being so, why "prefer" 47 to 50? Or 22 to 20, or 68 to 70, or any of the other new-fangled numbers to the easily remembered 10, 25 and 50?

It all arises from the fact that it is impossible to manufacture anything exactly to a given value. There must always be some tolerance, however small. And the cost goes up very steeply as the tolerance is reduced. So it is wasteful to specify a closer tolerance than is really necessary. In ordinary receiver circuits there is rarely anything substantial to be gained by keeping the values of components, except those required for tuning, within closer limits than $\pm 10\%$. In fact, many of them can be allowed a $\pm 20\%$ tolerance,



which means that one marked 50 may be anything from 40 to 60.

In the old days, the main standard values were 10, 25 and 50, with their multiples of ten. Assuming a $\pm 20\%$ tolerance, the allowable spread of each value is shown here in the right-hand column of Table 1.

Nominal Value	Acceptable Values for $\pm 20\%$ Tolerance
10	8-12
25	20-30
50	40-60
100	80-120

TABLE 1.

All is well so far, but what intermediate values would you choose? Even with such a wide tolerance as 20%, there is a large gap between nominal 10 and 25. A likely value would be 15, which would spread from 12 to 18, and so would begin where the nominal 10 left off. But there would still be a gap from 18 to 20. If a standard value of 20 were added, this would spread from 16

to 24, so components that measured between 16 and 18 would be in rather an ambiguous position, since they could be sold as either 15 or 20! Similarly for those between 20 and 24.

So our tidy, sensible round-number scheme is already beginning to look a little less tidy and sensible. It was this that led to the idea of choosing nominal values such that the usual tolerances would include all possible values without any gaps or over-lapping. The problem was to divide the whole scale from 10 to 100, so that each division would represent the same tolerance spread from a nominal value. Obviously if this were done from 10 to 100 the same plan would work for 1 to 10 and 100 to 1,000, and so on, covering every possible value.

Musical readers will see that this is the same kind of problem as what they call equal temperament—the dividing up of the octave into a number of equal intervals corresponding—as nearly as possible to the existing musical scales. But, as they know, it is impossible to make equal divisions correspond exactly with the simple ratios required for perfect tuning, and the equal temperament whole tone—corresponding to tolerance in our problem—cannot be exactly the 9:8 ratio that makes a true whole tone. Another similar problem, a little nearer our subject, is the dividing up of the 1:10 ratio, or decade, into the ten equal-ratio parts we call decibels.

Starting off with the widest standard tolerance, $\pm 20\%$, we see from the above table that the top-limit value is in every case $\frac{1}{4}$ times the bottom limit. We want to make the first standard value as good as we have seen, the corresponding limit values are 8 and 12. Multiplying 12 by $\frac{1}{4}$ brings us to 18, which is the top limit of 15. The top limit for the next preferred value would be $\frac{1}{4}$ times 18, which is 27, and the number that 27 is 20% more than is 22.5. That is already beginning to look a little odd.

Proceeding in the same way to the next preferred value, we find it to be 33.75, which is worse. But that is not the worst of the matter because it turns out that we do not arrive, as we had wanted, at 100. It falls between two of the preferred values found in this way. After all, it is rather too much to expect that a sequence based on a previously chosen tolerance would end up exactly on 100. One could, of course, abandon the idea of trying to fit the series exactly into a decade scale, but that would sacrifice the immense advantage of having the same numbers repeating as multiples of ten in both directions without limit.

So it is necessary to begin afresh. The kind of scale on which a given ratio is represented everywhere by the same length is the logarithmic scale, with which slide rules are marked. If we try to divide the 1:10 slide-rule scale into equal lengths representing 1:14 we see, as we have already found by calculation, that it does not go exactly. The nearest whole number is six times, and the ratio represented by one-sixth of the whole scale is about 1:1.468, instead of the 1:1.5 we wanted. The corresponding \pm tolerance is just under 19%.

Now, if 47 $\pm 20\%$ is considered rather odd, what would people say about 46.4195 etc. $\pm 18.96\%$ etc., which is the



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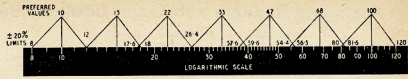
sort of thing a mathematically perfect preferred-value system would give! This was considered rather too much to swallow even in the interests of science, so it was decided to accept slight overlapping of some of the divisions in order to retain the standard tolerance figures and also to allow the "perfect" nominal values to be rounded off to not more than two significant figures. The sequence so obtained is 10, 15, 22, 33, 47, and 68; and it starts all over again with 100, as shown in the diagram.

So we see that if, for example, we had a vast stock of resistors of every possible value between 8 and 80, we could sort them out into six piles labelled 10, 15, 22, 33, 47, and 68, without any of them being more than 20% high or low. And 36 piles would provide for every value between 8 ohms and 8 megohms.

20%	10%	5%
10	10	10
—	—	11
—	12	12
—	—	13
15	15	15
—	—	16
—	18	18
—	—	20
22	22	22
—	—	24
—	27	27
—	—	30
33	33	33
—	—	36
—	39	39
—	—	43
47	47	47
—	—	51
—	56	56
—	—	62
68	68	68
—	—	75
—	82	82
—	—	91

TABLE 2.

Half the tolerance, $\pm 10\%$, or a 9:11 ratio, is represented by half the distance on the logarithmic scale; so twice as many piles are needed, the new ones being centred on the limit values for the 20% classification. There is no difficulty in deciding on 12 as the first of these additional preferred values, because that is exactly 10 + 20% and 15 — 20%, but there might be a difference of opinion about some of the others. As a matter of fact, the correct approach is to begin with the smallest standard tolerance, $\pm 5\%$, and divide the decade into 24 sections. The exact tolerance with no overlapping would then be about $\pm 4.8\%$, but this allows no margin for any rounding off of the nominal centre values. When they have been rounded off to the two-figure numbers that give the smoothest sequence, the $\pm 5\%$ values are 11, 12, 13, 15, 16, 18, 20, 22, 24, 27, 30, 33, 36, 39, 43, 47, 51, 56, 62, 68, 75, 82, and 91. Crossing out every alternate one leaves the $\pm 10\%$ values, 12, 15, 18, 22, 27, 33, 39, 47, 56, 68 and 82; and repeating the process leaves the $\pm 20\%$ values, 15, 22, 33, 47, and 68, as before.



So the whole list of preferred values can be set out as shown in Table 2.

There is no attempt to divide the values any finer for the higher grade components having standard tolerances of $\pm 2\%$ or $\pm 1\%$; so if you wanted, say, 80 ohms $\pm 2\%$, it would either have to be ordered as a non-preferred value, which might not be readily obtainable, or searched for out of an 82 ohm wider tolerance batch.

Incidentally, resistors with silver or gold bands in addition to the usual three-band colour code are not, as might be supposed by the uninitiated, of a particularly select kind; their tolerances are 10% and 5% respectively. The more choice 2% and 1% components are distinguished respectively by an uninteresting red or brown. If there is no tolerance colour at all, $\pm 20\%$ must be assumed.

—“CATHODE RAY.”

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Silver Plated M.B.C. Holders, suit NE51 Neons	1/7
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"Zephyr" Model 102 Adjustable 6 Foot Trisland	£3/8/8
"Zephyr" Model 115 Desk Mike Stand 3" x 6", 8" T.P.L.	18/-
Scope "Everyman's" Electroplating Outfit	£2/4/3
Scope "Jeweller's" Electroplating Outfit	£3/1/6
Scope Six-Second Soldering Iron	£2/4/7
Scope Etching Tool	£1/15/-
Scope 240/4v. Step-down Transformer	£22/2/9
Scope Spare Soldering Iron Carbons and Tips	8d. each
12 Position Rotary Tap Switches	4/6 each
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Women and Radio are an Open Book to Me

With Apologies to "Reader's Digest"

The other night my wife brought a couple of her visitors into my shack and after the usual showing off on my part she said, "Pansy is really so clever at radio, it holds no secrets from him." The visitors, looking suitably impressed, were shown out shortly after this.

As I was making my way toward the kitchen, I was stopped short in my tracks by hearing my nine-year-old daughter say, "Mummy, is Daddy really as clever at radio as you say he is all the time?" "Of course not. He just likes to think that we think that he is."

I was going to speak up then, but my wife went on before I could open my mouth. "It's a kind of game, Audrey. You'll play it yourself when you grow up. All men are the same. You have to flatter them. They like to think that they are big and strong and clever and hardworking, and that we could not get along without them."

Audrey was apparently puzzled by this revelation and finally said, "Don't you love Daddy?" "Of course I love him. That's why I let him break his finger nails on suitcases because it makes him happy to think that he is strong and clever and can open suitcases, while I am too dumb to buy a railway ticket without help, and can't get the top off a tube of toothpaste." After a while she said, with what sounded like a sob in her voice, "Or get up myself on a cold night to get a glass of water."

I silently retired to my shack so that they would not know that I had been eavesdropping on this blood-curdling revelation and also because I wanted to see how long before Audrey would try and put this philosophy into action, and then I would whack it out of her with a hairbrush. My wife was too far gone down the path of deception to be worth the trouble, but Audrey could still be saved.

The try-on by Audrey, when it came, was not what I expected. Later on in the evening she wandered into my shack and stood by my chair while I was tuning up and down the band. I thought, here it comes, first the build-up, then the request for the increased allowance, finally the hairbrush.

She said, "Daddy, you know what?" "No what?" "Mummy thinks you are a dillpot." "What makes you say that?" "She said so. She said you aren't as smart as you think you are." "That wasn't what she said—I mean, when was all this?" "Today. She said that all men are dumb, and if you oil them right you can make them do practically anything for you."

"Well what do you think?" I said. Her essential honesty was clearly coming to the fore. I didn't have to worry about her. Not Audrey. I felt a great surge of affection for my daughter.

She said, "I don't think you are a dillpot. You wouldn't fall for that kind of business. Maybe other men would, but not my Daddy. No sir, I'll bet." She slid her arm around my neck, "Nobody is as clever as you are. Nobody can make kites as good as you can." She climbed into my lap. "Or tell such good stories." She put her head under my chin. "Or work the DX stations like you do." She put both arms around my neck and squeezed tight. "I like you. I'll bet you're the smartest man in the whole world. I don't care what anybody says."

I wanted that 807 rather badly, but two and six a week is hardly a decent allowance for a nine-year-old girl, after all. So right there and then I raised her allowance to five bob!—SPS.

A CRYSTAL CONTROLLED SERVICE OSCILLATOR

(Continued from Page 5)

adjusted so that with both 6AU6s out of their sockets the current through the VR valve is 30 Ma. A heavy duty 30 to 40 Ma. bleeder resistor can be used instead of the VR valve. The main thing is to see that the output of the filter is between 100 and 150 volts and that the actual voltage on the screen of the r.f. valve is between 50 and 60 volts. In measuring this, do not forget to make allowances for the extra voltage drop across the screen resistor due to the current taken by your voltmeter.

For the Amateur who has a number of crystals, and who can work them into a job such as this, will soon find it a valuable piece of test equipment as we have done.

KEY PLUG FOR TYPE A MK. III.

Recently found myself in need of a plug to connect the key to the Type A Mark III.

It was found that the Teletron midget 4-pin plug filled the bill very nicely—providing one pin is removed.

A little observation will soon indicate the pin to remove.—VK5JD.

SUBSCRIPTIONS

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AMATEUR CALL SIGNS

FOR MONTH OF FEBRUARY, 1953

ADDITIONS

VK— New South Wales
2GR—T. Storer, 88 Provincial Rd., Lindfield.
2HX—T. L. Somers, 2 Ingham Ave., Five Dock.
2NQ—N. S. Piermont, 12 Maroonpa Rd., Miranda.

2AKX—A. M. McGregor, 4 Bland St., Ashfield.
2ASQ—J. F. Taylor, 39 Darling St., Tamworth.
2AUL—J. D. Lewis, Awaba Rd., Toronto, 2N.
2AWT—N. J. G. Walling, 23 Station St., Pymble.

Victoria

3YX—J. Della-Pietra, 12 Rose St., Bentleigh.
3AHE—H. J. Bassi, Signals Section, R.A.A.F., East Sale.
3AWI—W. H. Oldham, 34 Northcliffe Ave., Edithvale.

Queensland

4OB—J. P. Baker, 29 Cromwell St., Woolloowin.

South Australia

5OR—B. H. Bussenschutt, 30 Pulsford Rd., Prospect.
5SQ—S. Tseuber, 4 Union St., Goodwood.
5VL—V. J. K. Stutts, 12 Signals Section, R.A.A.F. Station, Darwin.

Western Australia

6EF—E. H. Foley, Thatcher St., Waroona.

Territories

1BJ—B. J. Coles, C/o D.C.A., Cocos Island.

ALTERATIONS

VK— New South Wales

2BZ—7 Seventh Street, Lambton.
2DW—187 Dargan Street, Yagoona.
2LE—30 Carlton Crescent, Kogarah Bay.
2QD—Cr. Hague St. and Prime Lane, Lavington, via Albury. Postal: C/o Lavington Post Office, Lavington.
2YG—Lot 118, Werrimoon Road, Engadine.
2ABE—30 Second Avenue, Campsie.
2ACJ—Killeston St. East, St. Ives.
2AJC—Flat 200H, Harrgrave Park.
2AJC—115 Pentecost Highway, Turramurra.
2AFO—3 Muriel Street, Hornsby.
2AQL—28 Park Avenue, Mosman.

Victoria

3CU—Lot 67, Macrina Street, East Oakleigh.
3LO—7 Donald Street, Highbury.
3PB—Williamson's Road, Doncaster.
3YW—28 Lava Street, Warrnambool.
3ZH—Old Warrandyte Road, Warrandyte.
3ZT—3 Donald Street, Murrumbidgee.
3ACH—Blackburn Road, Doncaster East.
3AIX—5a Albert Street, East Preston.
3AJH—23 Tambo Avenue, East Reservoir.
3AJS—645 Hampton Street, Brighton.
3AMZ—8 South Avenue, Moorabbin.
3ASC—C/o Sergeants' Mess, Army Apprentice School, Military Post Office, Balcombe.
3ASH—C/o Shell Hotel, Corio, North Geelong.

Queensland

4KR—71 Malcolmson Street, North Mackay.
4WD—21 Hall Street, Rockhampton.

South Australia

5LS—43 Boothby St., Col. Light Gardens.

Western Australia

6DH—Lot 12, Melville Beach Rd., Applecross.
6YN—102 Guildford Road, Baywater.
6LG—63 McDonald Street, Como.

DELETIONS

New South Wales: VKs 2KK, 2WY, 2ANZ, 2ATL.

Victoria: VK3RM (now operating under VK3YX).

Queensland: VKs 4BE, 4CI (now operating under VK2ABE), 4XQ (now operating under VK2NQ).

Western Australia: VKs 6JC (now operating under VK1BJ); 6VK (now operating under VK5VL).

Territories: VK3PY.

DX NOTES BY VK7RK*

The month of February, as is usual, gives the first indication of the change to come at the end of our "DX Season" and a gradual re-arrangement of operating times to suit winter conditions. This is borne out mainly by the falling off of night time long skip operation, such as Europe short route, around 1400z on 14 Mc., with the consequent improvement in long path working, fewer openings on 21 Mc., and slightly better conditions on 7 Mc. So far there doesn't seem to be any change in 3.5, but as the next few months advance and QRN eases, these latter two bands should be really worth watching. It will be interesting to note how these bands behave this winter as we approach what seems to be recognised as an all time low in sun spot activity.

3.5 Mc. finds me indebted to 4XJ for the only piece of info and that is that there are two W stations, calls uncertain at the moment, both awaiting receipt of QSL to determine the first applicant for DX C.C. on this band. Anyone who has battled QRN on 3.5 will agree that this is some achievement.

7 Mc.: A source of interest here has of course been the W phone debut and quite a lot of the gang can be heard having excellent QSOs along these lines. Quite a long hop from the pre-war days when the agreement seemed almost universal to keep 7 Mc. for c.w. only at night. Time marches, but whether for better or for worse is left to individual opinion.

Erle BERSI95 plans for 1953 to confine his listening solely to this band and, judging by results already achieved in a short space of time, will finish the year with a fine total. 50 countries in 24 zones have already been logged, some of the prefixes being CT, CT3, CN8, DL, EA, GI, I, HB, IS, K06, KC6, KJ6, KY, KVA, LA, OE, OE3, OZ, PA, SM, TA, UA, UB, UL, UL, VQ4, VY, YI, YU, ZS, ZS7, ZS9, 4X4, 5A. Who was it said 7 Mc. was no good for DX?

2AMB still likes this band also and worked PA0UL, SMSAFN, LA3C, PYIAHL, and SP3PL. VK3 S.W.L., Don Granley, comes up with a nice list of calls heard including EA5CS, UB5KBB, HB9MK, KL7AV, KB6AY, CO7HS, UAOKFA, UA3KQB, YUIBEF, EI8C, CTIDJ, FA9IO, SUIRS, MB9CA, MP4CC, KV4AA and many others. The times given by Don for the European stations, all between 2000z and 2200z, bear out the opinion of the gradual change in conditions and from now on we can expect 7 Mc. to improve for this continent in the early mornings.

Among those who enjoyed the W phone QSOs were Hans 3AHH and 3ATN who worked over 40 of them the first week-end. A further note from BERSI95 gives the dope that GC3HFE of Guernsey, Channel Is., uses only 9 watts on c.w., but has been heard with a very good signal.

14 Mc. has to be followed with a little more care now, but nevertheless still provides the bulk of the reports. 3AWW maintains his flow of good ones, working FM7WD, CR9AF, CE1BX, ZS3U, ZS6AUF, ZC4VP, ZB4BU, TA3AA, GC2CNC, 4X4FW, SP6XA,

SP2KGA, DUICV, EI4X, HSIVR, and GI5UR. Bill is a little doubtful of the LB3Q he chased, but I would say it was OK and give it to Norway. 2AMB QSOed LU2BG, OH3RA, GI4RY, OA4ED and YU3BB.

4XJ worked OA4ED, C3BF (Formosa), MB4BBE and 4X4FW. 3AHH finds that February's 28 days not long enough but nevertheless reports OA4ED* (this bloke seems to get around), VQ3KIF, LU8EE, MI3AB, ODSAD, TF5SV and ZP2CA. Zone 40 is not very common and for those interested, the TF was heard at 1140z.

My own activity has been extremely limited during the month, but some of the calls that managed to filter through the cob-webs were VU2JK, GW3FYR, EA3GF, 9S4BS, SUISS, KV4AA, OH4NT, FN8AD (still nothing definite on this one), OZ5LR, 5A3TY, YU3BC, TA3AA, XZ2OM, OD5LC, MP4BBD.

Am fortunate in now having two ex-DL correspondents, both named Hans, to complete the coincidence. The newest is 2AOU, ex-DLIEZ, who briefly gives the dope on VK sigs as heard in DL land. Hans was a s.w.l. from 1930 to 1949 after which he obtained his DL call for 18 months before coming to Australia. During that time he worked 110 countries in 33 zones. QSLs were eight short of DX C.C., but is still on the job chasing the slower ones. Hans mentions that it was not usual to hear different States on any one week-end, VK2 one week-end, VK3 or possibly VK4 the next. Short route signals (afternoon in DL) were generally stronger, but much harder to work owing to terrific QRM, but long route (afternoon in VK3) although signals were weaker, much easier to copy.

Since October, 2AOU has worked 27 countries in 13 zones. The latest listings were: DU1TF, VK8WC, ZK2AA, VR4AE, VK1RG, PJ1AW, SM7QK, CE8AO, ZM6AA, KJ1AJ, K3ACDL, SP2KAC, OD5BH; heard: MF2AA, PY2CK, KX6AB, ZC4CP, CN8FN, VR4RV, KT1WX, VR3C, GD2FRV, VS8AW, ZSIH, KV4BE, VR3PF, HZISD, ZM6AC, MI3US, and MP4HBK. He doesn't mention which are phone or c.w., but some of the above are obviously phone and others appear to be c.w., so I take it the list combines both.

Specifically on phone, from 3AWW who QSOed 5A3TL, ZS6QG, OD5BH, 3VB8B, OD6A, VK1HM, VY5AE, ZS3MP, VQ4RF, LU8FAO, and missed out on ZP5CF and EA9AR. 3AHH sends in KR6AC*, HC1GF, VP8SD HZ1TA. From 4XJ: KB6AY*, and from 4CW: HK5ER*.

21 Mc. is heading for the short skip season. The only DX I worked all month was F3TP. 2AOU heard CT1IP. Most of the other mentions of the band are of Interstate working.

28 Mc.: 4XJ's list grows a little smaller but is still the only report I get for the band. Les managed KH6UL*, KH6AGY* and KATAB.

QSLs received by lots, but not me. 3AWW had FQ8AP, VP6SD, KJ6AW, 3VB8B, KC6QL, VQ3BM. 3AHH: ZM6AA, GI4RY. BERSI95: CR5UP,

FR7ZA, FF8AN, FQ8AC, GC3HFE, KA9AA, HH2FL, KM6AH/KB6, FK58BC, PK4VD, TA3AA, VE7AII (21 Mc.), 4X4BT.

Some QTHs of note are: ZP5CF, Box 512, Asuncion, Paraguay; EA9AR, Manuel Mebela, Box 2060, Casablanca, or via CN8MM; HH2FL, Franck Lanoix, Box 153, Port au Prince, Haiti.

A few jottings of general interest include a note on FQ8AP who is in the French Aeronautical Service, running 15 watts at Fort Archambault. He will be there for another year and is looking for VK contacts at suitable times.

VQ3BM is in D.C.A. at Aeradio Station, Mbeya, Tanganyika, and remotely controls his rig over one mile of line. He leaves in August, but until then anticipates being in 14056 K. 0400z to 0930z and 21084 K. 1030z to 1530z. He has a stack of cards for VQ3DI who appears to be unknown there.

VK1HM says that Dave Carpenter will be or is operating as ZC2AC at Cable and Wireless Station, Direction Is., Keeling and Cocos Is. Group. Another, Arthur Wellard, may operate from same place, call as yet unknown.

DX C.C. LISTING

PHONE			
Call	No. Ctr.	Call	No. Ctr.
VK4HR	- 12	VK4RT	- 22 124
VK4S	- 13	VK4WJ	- 22 125
VK3EE	- 10	VK4RW	- 22 115
VK6RU	- 2	VK4JP	- 8 114
VK6W	- 9	VK4AD	- 20 109
VK4KS	- 9	VK4S	- 20 105
VK6KW	- 4	VK4AT	- 13 102
VK3LN	- 11	VK4HA	- 15 102
VK4P	- 11	VK4B	- 20 101
VK3AW	- 14	VK6PJ	- 19 101
VK3JE	- 7	VK3IG	- 5 100
VK6T	- 6	VK3GG	- 18 100
VK6DD	- 6		

C.W.

Call	No. Ctr.	Call	No. Ctr.
VK3EE	- 6	VK4RF	- 11 125
VK3HR	- 3	VK4RP	- 12 123
VK3PH	- 15	VK3KE	- 3 122
VK4EL	- 9	VK3JI	- 25 118
VK3P	- 2	VK3J	- 28 117
VK2BO	- 2	VK3HT	- 37 117
VK3CN	- 1	VK3UM	- 12 116
VK3GW	- 16	VK3YL	- 30 115
VK3RX	- 23	VK7LJ	- 24 114
VK3CX	- 26	VK4DA	- 7 113
VK3BA	- 36	VK7LZ	- 33 112
VK6RU	- 18	VK4RC	- 13 117
VK4QL	- 36	VK6KW	- 40 104
VK3BO	- 33	VK4CY	- 34 103
VK3W	- 4	VK3BA	- 14 101
VK2QL	- 5	VK3AN	- 19 101
VK3KB	- 10	VK3OA	- 32 101
VK3L	- 21	VK3BK	- 22 100
VK4DO	- 20	VK3AEZ	- 35 100
VK3JE	- 21	VK3XK	- 41 100
VK3XK	- 30		

OPEN

Call	No. Ctr.	Call	No. Ctr.
VK3BZ	- 4	VK7LZ	- 23 116
VK3W	- 7	VK3VJ	- 46 115
VK2NS	- 16	VK3AS	- 83 115
VK6RU	- 8	VK3JA	- 43 114
VK3JE	- 12	VK3ADT	- 14 113
VK3W	- 2	VK3C	- 26 113
VK3HG	- 3	VK3MM	- 49 111
VK5KW	- 13	VK4RC	- 21 110
VK3W	- 2	VK3BA	- 34 110
VK3KX	- 1	VK3HO	- 38 110
VK4EL	- 10	VK3ZC	- 25 108
VK3W	- 7	VK3L	- 11 106
VK4DO	- 15	VK3AWN	- 105 105
VK3IAWW	- 45	VK3VN	- 18 104
VK3LN	- 29	VK4UL	- 27 104
VK3P	- 28	VK3B	- 47 101
VK3MC	- 5	VK6PW	- 50 104
VK3OP	- 19	VK3HZ	- 17 103
VK4V	- 40	VK3BK	- 30 103
VK6DD	- 22	VK3TI	- 37 103
VK3RT	- 41	VK6DX	- 42 103
VK3BE	- 13	VK3BK	- 31 102
VK3GW	- 48	VK3L	- 35 102
VK3AIA	- 9	VK3XK	- 54 102
VK3HM	- 30	VK5HI	- 51 101
VK3JI	- 32	VK3AC	- 6 100
VK3JI	- 32	VK3TG	- 30 100

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35 pF. Single Gang, Dual Spaced 17/6
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Feed Through Neut. Condenser, plate diameter 1.27/32 in. 25/-
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150 pF. per Section, Dual Junior, £3/10/-
200 pF. per Section, Dual Junior, U.H.F. £3/10/-

Postage and Packing: Vic., 4/-; N.S.W., S.A., Tas., 5/-; Qld., W.A., 5/6.

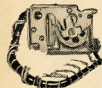


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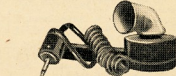
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FIFTY MEGACYCLES AND ABOVE

Compiled by J. K. RIDGWAY, VK3CR.

2 MX OPENS FOR VK3-VK7

The night of the 24th February made up for all the time and work put into the 2 mx skeds by the Launceston gang. At 1920, 7PF heard 3ABA's automatic m.c.w. very weakly. The signal built up to a maximum at 2045 and was out at 2050. As many calls had been given with no QSO, 3ABA was raised by land-line by 7PF at 2105.

Jim swung his beam again and commenced working 7BQ at 2115, but QSB put the signals in the noise before a QSO could be made. 3CP also heard 7LZ's c.w. at this time. 3RK was then worked by 7PF at 2132 with signals both RST 579. This was followed by QSO with 3RK by 7LZ and 7BQ. 7LZ at 2206 worked 3ABA, followed by 7PF and 7BQ. 7GM came on to work 3RK for his first VK3 QSO. He was followed by 3YS who also worked all VK7s. The VK3s could still be heard at 0055 on the 25th when they QRT. More than one QSO took place between some stations as conditions were good enough for a long rag-chew.

Skeds were arranged for 0645 on the next day. 3ABA and 3RK were heard on c.w. at RST 549, but no QSO resulted.

These good conditions were obtained on the trailing edge of a slow moving high pressure. Radio-sonde readings taken at Laverton at 1400 hours shows no temperature inversion, but a layer of dry air between 1,500 and 10,000 ft. with layers of moist air above and below. This could point to a possible duct having been present.

An interesting point noticed was the QSB. When 3ABA's signal went up in strength, 3RK's signal went down. This was also found by the VK3s with the VK7 signals.

We hope that this opening will encourage more VK3 stations to keep the skeds and also to call, leave their carriers on, do anything but only put a signal on the band when conditions look right. As the best time of the year is to come, we can only hope for many more interesting contacts.—7PF.

N.S.W. V.H.F. GROUP

On 14th February some of the V.h.f. Group, N.S.W. Division, took a trip to Newcastle to attend a meeting of the Hunter Branch of the W.I.A. They took with them lecturers and approximately 20 units of v.h.f. gear, from pip squeak tx to 100 watt tx's, rx's, converters, g.d.o.s, super regen's, etc. The chief lecturer was 2AB, Berry Beresford, supported by 2ANF, John Miller, and 2AJX Harry Solomons. We were very grateful to see such a good roll up of Hunter Branch members, 76 in all. Lionel Swain, Chairman and President of the Hunter Branch, turned the meeting over to John Miller, President of the N.S.W. V.h.f. Group, who introduced the lecturers. After the lecture, a note of thanks was given by John Clarke to N.S.W. Div., supported by 2AGY. We take this opportunity of thanking the Newcastle boys for their conviviality and interest. We also wish to congratulate their President, Mr. Lionel Swain,

on having been awarded the honour of life membership of the N.S.W. Division.

50 Mc. News.—This band has been reasonably active this month, 2JX having contacted 2WH with good signals both ways. 2AH and 2JU have both been heard working with 2GU Canberra with very good signals both ways. 2ANF had QSO cross band 2 and 6 mx with 2GU. The band custodian, 2RU, has been heard frequently in contact with 2ADT and 2AGY. 2VW, 2HE, 2AJR, 2AKK, 2ABC, 2WJ have been on fairly regularly. Once this month ZLs have broken through, but all around, conditions have been bad in N.S.W.

144 Mc. News.—As usual this band has been active, with many of the distant country stations coming in with good strength. Canberra stations 2GU and 2PM have been R7 in Sydney. 2WH at Forbes is perhaps the most consistent. 2ADT, 2AGY, 2ADS, 2BZ, all of Newcastle area, have been worked at good strength. 2OT has been heard in Sydney S4. We have not heard 2XY for some time. 2ANU, Muswellbrook, has not been heard in Sydney this month. 2AGY says that he is interested in hearing 2GU and 2PM; Fred's frequency is 144.004 Mc., he uses c.w. and phone, and has a really good signal in Sydney. The mobile boys have been out this month, and caused quite a lot of interest. 2ANF/M, the Gladesville Radio Club 2ADY, 2ABO, and 2ATO/M/Walkabout!

On Wednesday 18th, 2ANF/M went out to French's Forest, the Sydney boys had to plot his QTH. A lot of fun was had by all, and some rather funny bearings were given. Stations that participated were 2LZ, 2HO, 2WJ, 2QW, 2HL, 2ABB, 2AJZ, 2LG and 2AQB.

On Sunday 21st Gladesville Radio Club held a field day of mobile stations who all went to secret locations. The home stations were all invited to join in and plot the whereabouts of each mobile unit. Although the weather was not all to be expected, a very good and interesting day was had by all. Some stations were mobile all the way there and home. Mobile stations participating were 2AOY, 2ABO, 2YE, 2ATO, 2AOA, and 2HL. That night their whereabouts were divulged. Some very accurate bearings were recorded, and by the same token some very funny bearings were also given. Thanks a lot to the organisers, it was a good effort.

A few of the DX frequencies may be handy. 2GU's frequency is 144 Mc. and 2PM 144.15 Mc., both of Canberra, 2ANU Muswellbrook 144.6 Mc., 2VU Singleton 144.15 Mc., 2TA Young 144.74 Mc., 2AMV Forbes 144.07 Mc., 2NS Bathurst 144.04 Mc. Newcastle boys: 2ADS 144.14, 2BZ 144.126, 2AGY 144.004. A new station on 144 on c.c. is 2ARM, welcome to the band OM.

576 Mc. News.—Now that the DX is out, interest will be directed to the 576 Mc. band. The Newcastle boys have shown interest this month and 2BZ has acquired some gear for this band; this means that other Newcastle boys will become interested. In Sydney, stations equipped for 576 Mc. are 2WJ, 2AJZ, 2HL, 2VL, 2HO, 2JX, 2ABZ, 2AWZ, 2ANF, 2YR, 2XX, 2PU, 2XG and 2VW.

Now how about getting on all of you. I have even heard that 2RU is keen. Cess Cronan has to be thanked for the good "urging" he has put into this 576 Mc. work.—2HO.

VICTORIAN DIV. V.H.F. GROUP

Apparently Amateur Radio teletype is gaining in popularity in U.S.A. Many v.h.f. Amateurs there are making contact by this method of transmission, employing audio frequency shift keying. This must be quite an interesting phase of radio work from both the technical and operational points of view.

The next V.h.f. Group meeting is on the 13th April at 8 p.m. in the Institute's Rooms. If you work on 50 Mc. or above come along and meet your fellow occupants of these bands. Visitors are also welcome.

The February meeting was preceded by a visit to the f.m. station at Jolimont. 18 were present for the inspection. A feature of the station noticeable from over a large area of the city is the mast and aerial. The mast itself is 200 feet high, and on top of this is a 30 ft. four bay turnstile antenna consisting of crossed folded dipoles. At the present time the station functions by replacing ABC programmes, so that none of the ancillary equipment and studios peculiar to the A and B class stations on the medium frequencies exists at the moment. The gear is therefore confined to that necessary to produce the required r.f. power together with the means to provide frequency modulation of the carrier. The input to the final amplifier (a pair of 827R beam tetrodes) is approximately 2 kw. These are preceded by a line-up of frequency multipliers and amplifiers with normal circuitry to the final frequency of 91.1 Mc. The set-up is reactance tube modulated and incorporates frequency stabilisation.

Some 6 mx Interstate openings during the latter part of February have been reported. After returning from overseas, 3NW has recently appeared on 6 mx. We welcome Ken back on the v.h.f. bands.

Once again 2 mx signals have spanned Bass Strait. On the evening of 24th February contacts were made between Launceston and stations in the metropolitan area. Transmitter powers ranged from 30 to 80 watts input to the final. The antennae consisted of the following types: Dipole, Lenfo, 12 and 16 element arrays, 5 over 5. Regarding locations, stations contacted are not much above sea level, while Launceston stations are situated in the Tamar Valley. The distance involved is roughly 270 miles.

It is of interest to note that a continuous test transmission is being maintained by the P.M.G.'s Research Section on a frequency of 160 Mc., the location of the tx being about half way up Mt. Arthur, near Launceston. Signal strength recording apparatus is located at Sandringham, Victoria. Recordable signals have been received on a number of occasions, and unusually high signal peaks were consistently recorded during the period 24th to 28th February. The tx output power is 16 watts and a five element beam is employed at each end. For those interested in comparing the meteorological conditions with the above v.h.f. results, the general nature of the atmosphere at the time (as confirmed by the Weather Bureau), was

characterised by abnormal temperature and humidity gradients caused by the drift of warm dry air over Bass Strait from the mainland, giving rise to super-refraction of the radio waves concerned.

As may be recalled, the first VK3-VK7 QSO on 2 mx was made in March, 1950, by 3AKE, of Geelong, and TPE. Stations coming on later from Burnie provided further contacts with VK3. However, those on the 24th were the first made between Launceston and the Melbourne area. On the same evening, the two active Ballarat v.h.f. Amateurs 3ZL and 3GM were received in Melbourne well above normal sig strengths. These stations reported reception of carriers on the VK7 frequencies.

Look for VK7 2 mx signals at 6.45 a.m. and after 8 p.m. The daily sked with VK2 is at 8.30 p.m. They transmit the first five minutes.

3AFF, of Shepparton, is now putting a stronger signal into the Melbourne area since increasing power with an 829B as the 2 mx final.

288 Mc. fans will be interested to know that Don 3FO, of Ballarat, calls Melbourne every evening at 2000 hours for five minutes, then listens for five minutes through till 2030 hours. 3AAF and 3AFJ also looking for signs of activity on this band. 3AFJ looks for signals from Geelong at 2030 hours till 2045 hours. SWL Gerry Lane at Tunstall has heard 3AFJ at S8 over a distance of six miles.

Members may obtain from the Secretary, contest log sheets which can be adapted for use in the v.h.f. field day contest. Next and final field day is on 26th April.—3ABA.

SOUTH AUSTRALIA

Clem 5GL reports that the various bands have nothing on the wide open spaces of Central Australia. Much trepidation in the land of Colonel Light Gardens as Bill Lloyd is completing a 50 ft. steel tower and an 829 final with 100w. slung in for good measurement on 144 Mc. Bill 5HD of course is famous as the relative of Hughie who has done so much to put VK5 onto the Ross Hull Trophy list.

Mac 5ME probably has the same feelings as myself when he opens his "QST" and sees there the R.C.A. ad. for the 6146 and in another spot "50 Mc. and Over" and I quote: "The new 6AJ4 tube is a triode specially designed for fellows who are looking for ways to improve their rx performance. It's grounded grid r.f. service at 420 Mc." and again, "A companion tube for u.h.f. t.v. mixer use is the 6AM4 . . . the noise figure of xtal converter was improved by 8 db by the addition of the 3842 amplifier, another high-gm triode." Never mind, Mac, we'll try tripling again!

The fish can't be biting too well at Lincoln because there is news that terrific activity on 6 and 2 mx has appeared in the shack of 5VJ and maybe that hop across the Peninsular will soon be made. Wally 5DF is also reported to be delving into the mysteries of the v.h.f. having put 50 c/s. just where they ought to be. 5VJ using a converted AR301.

Jack 5LR has found that 6 and 2 mx beams stay up easier than 10 or 20 mx ones, and has made a come back with crystal controlled tx and rx's. Back in

the post-war era we of the stay-at-home fauna found it convenient to listen and call on the v.h.f. bands between 1930 and 2000 hours each night. It was amazing who popped up wasn't it Max? What about it chaps? Joe 5JO is still listening. Maybe you'd better give a call next time Joe.

Les 5AX still working the city regularly, but Lance, at Clare, probably too busy putting out fires to use the power on 50 Mc. Saw a well known Mt. Gambierite recently heading away from the local "disposals hand-out centre"—I quote that famous saying! Doc 5MD, by the way, uses a ground plane fed with co-ax with an 815 in the final and for reception swears by a 10 ft. piece of Nylex inside the shack and attached to the R.A.A.F. converter.

My one-lunger has not rushed for months, but there are a fair crop of garden rakes around my suburb and on 288 we have Howard 5XA working Rex 5KY over the back fence. Keep it up boys, you'll be down my way soon.

Lorrie 5XN has 5MO's tower and is busy erecting it along with a 20 mx under—under I said—a 288 array. And before I leave you, my fellow strugglers, did you know that 5NL has broken in on 50 Mc. Good going Ron. You know of course that reliable communication can be made regularly over distances of 1,000 miles on 50 Mc. Yes, Sir, the Americans have done it on 49.8 Mc. and using 100 kilowatts. So brethren, jack up that old transformer and ring up the water supply for a 12 inch main. As for me, give me the transistor—it only needs a 1½ volt torch cell for crystal control on 144 Mc.—5XU.

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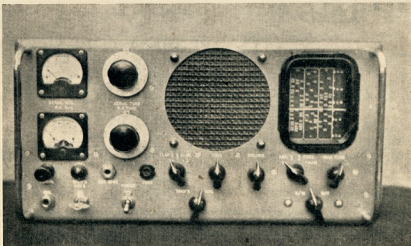
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Phone: M 1475-7

1952 VK-ZL DX Contest Results

With DX conditions in the doldrums, the small number of logs received was to be expected although many VK and ZL stations who participated failed to return logs and the same can be said of many Oceania stations, particularly in regards to the phone division. Much credit is due to those who unselfishly forwarded logs even though their scores were well below that necessary for the award of certificates.

It was decided after the 1951 Test that all competitors should operate for the same 24 hours, with no choice of hours. This feature caused hardship to at least one ZL who lost several "choice" hours when his AC power was cut in his district to conserve power. Electricity is still in short supply in ZL although the position will be OK in 1953.

The top c.w. scores were returned by VK2DG (top VK for the third year running) and by ZL2FA who needs little introduction into DX circles; while the phone winners were VK3LN and ZL2GX. A point of interest is the very small difference between the top VK and ZL scores in each division. Top overseas scores for c.w. came from W7PGX who used four bands, while overseas phone honours go to VS1EG who used one band. It should be noted that overseas stations used the "country multiplier" method of scoring while VK-ZL stations used the B.E.R.U. system.

Awards. Certificates were posted to all winners during the first week in February. VK special awards will be announced by W.I.A. Silver mounted plaques for the top ZL scorers go to ZL2FA and ZL2GX.

The 1952 Test was organised by the N.Z.A.R.T. The 1953 Test will be organised by the W.I.A.

C.W. SECTION

Australia					
Call	80	40	20	15	Total
VK2DG	—	1096	1274	118	— 2488
VK2GW	45	787	869	173	— 1874
VK2ANN	—	568	1169	45	— 1782
VK5FH	—	737	932	45	— 1714
VK2AWU	45	264	657	366	— 1332
VK6RU	—	502	573	—	— 1075
VK3HT	—	605	239	117	— 961
VK5KU	—	450	226	—	— 676
VK2AHA	—	—	401	232	— 633
VK3PL	—	398	222	—	— 620
VK3XB	—	385	189	—	— 574
VK3AAH	—	160	350	—	— 510
VK3CX	—	—	440	—	— 440
VK2RA	89	145	58	118	— 410
VK3ANJ	—	160	234	—	— 394
VK5XK	—	74	304	—	— 378
VK3HL	—	—	367	—	— 367
VK5WO	—	—	84	—	— 84
VK2JZ	—	—	—	—	— 84
Check	—	—	—	—	— 84

New Zealand					
Call	80	40	20	15	Total
ZL2FA	—	1117	1405	—	— 2522
ZL1AH	—	843	604	490	30 1967
ZL1MQ	74	444	681	158	29/73 1459
ZL4JA	—	808	569	—	— 1377
ZL2GS	—	529	249	—	— 778
ZL2BJ	—	739	—	—	— 739
ZL3LL	—	557	—	—	— 557
ZL3JA	—	—	—	388	— 388
ZL2MM	—	368	—	—	— 368
ZL3JT	300	—	—	—	— 300
ZL1QW	—	—	202	—	— 202
ZL2IQ	—	185	—	—	— 185
ZL2GX	—	—	158	—	— 158
ZL1HY	—	—	—	—	— 158
ZL3CP	—	—	—	—	— 158
Check	—	—	—	—	— 158

PHONE SECTION

Australia					
Call	20	15	10	Total	
VK3LN	1203	—	—	1203	
VK4KS	723	—	219	942	
VK2DG	839	30	—	869	
VK6RU	899	—	—	899	
VK3BD	516	—	44	560	
VK3AUP	503	—	—	503	
VK3ATN	402	—	—	402	
VK5LC	342	—	—	342	
VK6DX	247	—	—	247	
VK5CE	162	—	—	162	
VK2AHA	102	—	—	102	

New Zealand					
Call	20	15	10	Total	
ZL2GX	1186	—	—	1186	
ZL1MQ	382	15	15	392	
ZL4JA	109	—	—	109	
ZL1HY	—	—	—	—	109
Check	—	—	—	—	109

LISTENERS' SECTION

Australia					
E. Trebilcock, BERS195	—	—	—	—	1815
E. Giddings	—	—	—	—	1204

New Zealand					
L. D. Jones	—	—	—	—	638
R. W. Gray	—	—	—	—	591
J. B. Holder	—	—	—	—	295

OVERSEAS RESULTS

C.W. SECTION					
North America			F9DW		
W2WZ	—	286	OH2MC	—	28
W2EQS	—	30	OH1PW	—	27
W3LXE	—	264	OH3OX	—	24
W3QOR	—	12	OH1OW	—	21
W4HQN	—	504	OH2XK	—	9
W4KE	—	12	OH2VZ	—	1
W5ADZ	—	2175	HB9CZ	—	72
W5LFH	—	784	PA2VB	—	108
W5UKL	—	752	DL1FF	—	28
W5OLG	—	187	DL1FE	—	264
W6IBD	—	1680	DL1XP	—	234
W6ATO	—	1394	DL3BK	—	144
W6AM	—	530	DL1YA	—	4
W6WOO	—	154	OZ7PH	—	161
W7PGX	—	4384	OZ5LN	—	32
W7DL	—	2134	G4CP	—	481
W7HAD	—	1000	G6BS	—	390
W7PQE	—	546	G6XN	—	140
W6NWX	—	1775	GW5SL	—	100
VE7AIH	—	175	G14RY	—	30
Europe			SM7QY		
ON4PA	—	35	SM5CO	—	264
F9RM	—	77			180

Oceania					
SM5LL	—	145	KH6ARA	—	1909
SM5AQV	—	75	KH6AHD	—	1604
SM7AVA	—	52	Y7IAB	—	986
SM3AKM	—	48			
SM5WJ	—	36			
SM7YO	—	35			
SM5ANY	—	32			
South Africa					
ZSIH	—	28			
South America					
CE3AG	—	741			

PHONE SECTION

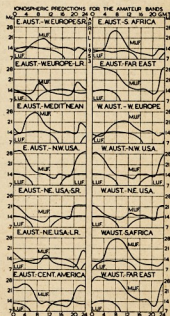
North America					
W2WZ	—	3	SM7YO	—	2
W3LXE	—	4	OK1MB	—	230
W6DI	—	369	F8FT	—	35
W6IBD	—	196	G6XN	—	3
VE7AIH	—	95	South America		
			PY2AHS	—	4

Europe					
PI1J	—	203			
PA0NU	—	112			
PA0BRG	—	66			
OZ7SM	—	40			
SM5ACC	—	304			

LISTENERS' SECTION

Austria					
OE403	—	576	OK3-10603	—	53
OE196	—	330	OK15822	—	403
OE491	—	144	OK1-4921	—	8
OE499	—	126			
OE325	—	105			
OE181	—	50			
OE150	—	32			
OE475	—	15			
Japan					
J1-680	—	225			

PREDICTION CHART FOR APR., 1953



FEDERAL QSL, and DISTRICT NOTES

FEDERAL

R.S.G.B. CORONATION RELAY

During the years 1930 to 1939 an important feature of the Radio within the British Empire was the Annual Loyal Relay. Over this year, His Royal Highness, the Prince of Wales, K.G. (now H.R.H. the Duke of Windsor), was Patron of the Radio Society of Great Britain, when, annually in June each year, Amateur Radio organisations throughout the Empire organised messages conveying Loyal birthday greetings to the then Royal Patron of the Society. The messages were relayed to R.S.G.B. headquarters via Aerials and radio channels where they were collated and taken to York House, London, on the morning of His Royal Highness' birthday.

This year, 1953, the Council of the R.S.G.B. has notified all Empire Societies that it has decided to organise a Coronation Relay—the first of its kind ever attempted—during which National and local societies throughout the British Commonwealth are invited to send messages of loyal congratulations to Her Majesty Queen Elizabeth so that her reach R.S.G.B. headquarters a few days before her Coronation on 2nd June.

It is requested that messages should originate from the President or Chairman of the appropriate Society and should include the name of the organisation and the call signs of all the stations involved in the message.

Mr. H. A. Bartlett, G5QA, Council Member and Coronation Relay Organizer, has requested the support of all Empire Amateur Societies to give the success it deserves. Mr. Bartlett, in his letter to W.I.A., has pointed out the interesting historic fact that only two of the six United Kingdom Amateurs should be involved in the first Loyal Relay in June, 1930, are still alive. They are Mr. Fred W. Miles, G5ML, and Mr. L. Howard Thomas, G6QB.

BEWARE OF BERYLLIUM POISONING!

A timely warning to Amateurs appears in "Radio 75" (official organ of the South African Radio Union) for June, 1953, edition. It concerns a harmful poisoning of human tissues that can be brought about by an accidental scratch with a tube of the compound containing beryllium used to coat the inside surface of the ordinary fluorescent lighting tubes.

Many Amateurs use these tubes as r.f. indicators—although they are not really volt-ohm meters—with great success, little knowing probably that they are playing with a rather dangerous "gadget". Should a tube be scratched, the surface of the skin cut or broken by a piece of the broken glass, beryllium powder can find its way into the tissues giving rise to indolent ulcers which apparently resist all attempts to effect a cure; cases have been known where the only successful treatment has necessitated wide surgical excision.

Take heed lest an accident occur with dire consequences to you or yours! Should a tube become broken accidentally, do not handle the fragments, but with rubber or leather gloves remove the pieces and bury them deep enough in the ground to avoid ever being dug up again. Where children are about, greater caution still should be exercised. The safest way would be not to have any of the tubes in your premises, especially installed in a lighting fixture!

ANNUAL FEDERAL DINNER

The Annual Federal Dinner of the Wireless Institute of Australia will take place at the Federal Hotel, Collins Street, Melbourne, on Easter Saturday night, 4th April, commencing at 8 p.m. when it is expected Delegates from each VK Division, representatives of the Postmaster-General's Department and the Broadcasting Control Board, Institute Officers and representatives of the three Services will be in attendance.

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FEDERAL QSL BUREAU

FAY JONES, VK9RI, MANAGER

Latest advices indicate that Felix Fichtette, 2P9CQ, ex-FK43, who has been in hospital for some time in his homeland, will leave for a further term of service in New Caledonia on 28th April.

A new ratty card especially designed and stencilled for the 1953 VK-ZL DX Contest is that from W5ADZ. The cards are striking, attractive, and well executed in coloured, frosted paints.

More hitherto unpublished QTHs by courtesy of Treb, BER8198: KM6AH/XB3 is now KB6AY, Fred Carpenter, care C.A.A., Canton Island, VS1DE now based in C. and I. period. Treb's pending issue of own call, VS3AAO also back in G after sojourn with R.A.F. at Salalah, Oman. Will send a QSL to G6G12, 2P2V, 2P2V, gives QTH as Box 136 Sandakan, Br. Nth. Borneo. FIRAC, ex-FBMT, Paul Boucher, BP327, Saigon, Fr. Indo China, reported to be returning to France shortly.

Regret notes short this month as writer has been on holidays and now cleaning up the mail accumulation. Treb's QTHs are of interest, renewed acquaintance with Doug, 2FII, Bill 3/E, and the squire of Parkdale, who has risen up the social side of the climbing party to other hobbies. Helps him to while away his time while stealthily listening for the rare ones.

Writer also had a ten day road bus tour to Sydney, but due to a pulled monkey muscle in calf and an abscess on the lower jaw (savours of foot and mouth disease) and a last minute change to busy itineraries, plans to meet several Sydney Hams and a trip to Bathurst went astray. Will all concerned accept regrets and apologies. However, did meet old friend, evergreen Jim Corbin, 2YC, the ubiquitous VK3 QSL Manager who never looked better or in such good fighting trim. Should think he will gain a power in the land with his unbounded energy and enthusiasm for the Ham game.

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NEW SOUTH WALES

The February meeting of the N.S.W. Division was held at Science House on the 27th with the President, John Moyle, at the helm. An attendance of about 100 members passed quickly through the business and recording of the principal item of interest which was a lecture on the Design of Receiving Valves by Messrs. Ron Tremlett, Edwin M. Johnson, and J. H. Bourne, of Philips.

The lecture was originally delivered at the I.R.E. Convention held in Sydney last year and was in fact the first of a series which was reproduced at excellent quality on the President's reproduction unit. The recording was presented on the tape and the reproduction of receiving valves taken at Philips' works. At the conclusion of the film at 9 p.m., Mr. Tremlett answered questions on the film for the first time and the recording was put on. The lecture was illustrated by lantern slides which were skillfully handled by our Treasurer, Bill Stew, and lasted till about 10 p.m. Mr. Tremlett and Mr. Johnson then answered a barrage of questions in a manner so interesting that 1.15 a.m. we were having been there past midnight had not a forcible halt been called. The lecturers were enthusiastically applauded for a very fine effort.

Nominations were then called for the position of Federal Councillor for the ensuing year and the voting was between John Moyle (2U) and Jim Corbin (2Y). Both were excellent candidates having declined nomination. Jim won the vote on a show of hands and congratulations are extended to him. Fought in a similar election in 1952, but was not accepted as observer at the coming Federal Convention and was elected unopposed.

COALFIELDS AND LAKES ZONE

2ANU has departed for a rest by the seaside, complete with portable gear for 40 and 60. 2VU has just returned from a similar excursion and now has a large programme of modifications mapped out. 2YL is again active and is picking up some time on 240 and 2FZ, still searching for the ideal rx, but is resting the tx. 2ADT hooked up some gear on 576 Mc., but has no results to report so far. 2BU very busy with house renovations which have curtailed his activity.

ACCURATE FREQUENCY TRANSMISSION RESULTS

Thursday, 26th February, 1953

7000 Kc.	12 cycles low
7020 Kc.	— 80 " low
7040 Kc.	— 18 " high
7060 Kc.	— 50 " high
7080 Kc.	— 456 " low
7100 Kc.	— 20 " high
7120 Kc.	— 5 " high
7140 Kc.	— No check.
7150 Kc.	— No check.

Ham activity. 2KR appeared on 40 after a long absence. 2AEZ, now in a new location in Melbourne, but before he had heard anything was heard of 2GA or 2EH, but 2ARV still keeps active on 40.

NORTH COAST AND TABLELANDS

The next big event on the North Coast is the Urunga Convention. No doubt you've all heard or read from time to time of the good time to be had at the gathering and if there are any who just can't make up their minds whether to come or not, then consider your trip to the coast a two-fold one. It's a good time and fellowship and I'm sure you will have no doubt as to what you should do.

A welcome goes out to Abe 2TG who is now stationed at Bellington and hasn't lost any time getting on 2C and 2D. Good signals have been heard from 2UC, 2GI, 2JC, and 2XO on 80 mc, whilst 2AHH had the fortune to work a few Ws on phone on the same band. Chris 2XO had a pleasant trip to Sydney and returned with a new utility ready for his long service leave, whilst Pete 2JA intends to spend some time at Williamstown with the R.A.A.F. Active Reserve. Len 2LR, of Kyogle, will soon have an interesting trip to the coast. The gathering was welcomed by Mr. John 2AMV who has been holidaying at Scott's Head once again and puts out a nice signal with the portable.

Roads again closed. The North Coast and quite a few North Coast boys were on their toes when they were needed. Although Kempsey only had three feet of water in the low part of the town, quite a few land larks went out of order—a condition which could prove serious for any town. It is hoped in the near future the M.G.M. will be able to arrange a periodic testing with the Police Department, because it is almost too late to test when the flood has done its damage, so an early announcement of the period when it will be welcomed by all here on the North Coast.

To finish on a more joyful note, tune up that old gear and join us at our Easter Convention at Urunga.

HUNTER BRANCH

As already reported in the "Bulletin," the February meeting, at which a lecture demonstration was given by the V.H.f. Group from Sydney, was attended by approximately 70 members. This was a very gratifying, both to the V.H.f. boys who brought their gear all the way from the "Big Smoke," and to the secretaries, who were very busy for this grand night. We were pleased to see among those present Phil 2TX who made the trip from Wyong to Newcastle for the first time. Upper Hunter, Geoff 2VU, who represented the boys in that area, Divisional Council honoured us by the presence of Secretary Dave 2EO and Councillor.

The Hunter boys are preparing for annual pilgrimage to the North Coast Convention at Urunga, and hence to bring back prizes. The gang will be led by 2AHA and Harold has purchased a car to cart the family and gear; it is specially designed for 100 vintage. Ideal for portable contests and finds hidden tx's by instinct! Secretary 2SF is also taking the family and Varley will likewise continue with amateur and holidaying. The Hunter boys are fishing and portable operation using Type 3 Ts and Rx. Also on annual leave will be 2NK, who would be glad to bring back prizes. 2UY as far as Urunga! 2KG is going again and Ken warming up portable tx by working DX on 2 and 2D, taking his "Snapper" for 144 hours on. Hoping to retain Fishing Trophy for the Hunter Branch is Associate, Syd Daniels, who will log-keep for 2AHA in contests. Les Spinks and XYL will be there—maple print call sign we hope. Originator of Urunga "Do," Crief 2XO and XYL Jean, passed through Newcastle recently and intend to go forward to seeing the Hunter gang at Easter.

Apart from playing with the grid drive of the five-band exciter, Fredrick 2CC has been busy in gardening. Although QRL selling the amber liquid, Treasurer 2XT has given much thought to plans to help country members. The W.I.A. has been busy with affairs is an example to many. Vice-President 2DZ was kept busy with firm's radio exhibit at Newcastle. Recently, a letter from the club on air was disclosed when Harold's photo appeared in local paper as prize winner in the cake cooking and decorating section of the Show. 2XW got very busy with the contest to do it more often OM. Although Norm 2ANA doesn't get on much, the old fox listens a lot. 2AXN still has a lot of work to do. 2ANL worried by the confined space at his "Hill" QTH.

From Maitland we hear that the "80 Mc Gentlemen," John 2XQ, is thinking of shifting QTH to "Coalie City." Keith 2DG has not completed re-orientation of antennae poles to suit new shack. We'll give him a hand about it. And seems Harry 2AFX will lose his independence later this year! 2FP taking things easy on the re-build. 2ANG gone back into his shell. Pleased to report New 2OS hopes to be active again shortly; feeling much better lately. 2ADS supplies following v.h.f. gossip: Doug himself made v.h.f. history in Newcastle when he QSOed 2BZ on 576 Mc. with gear Cec Cronin brought up for the V.H.F. Group demonstration. Fred 2AGY had strife with drive for the 144 tx, but puts out whopper sig from the 2 element beam on 6 mc. Max 2OT working cross-band 6 and 2 mc and doing some local mobile on 40.

It's news when 2BZ goes portable; Dave is holidaying at Port Stephens using 2AHJA's RA10 transceiver. 2XY working a little DX on 40 and 20 mc c.w. 2WP also chases DX and making changes in TA12C tank circuit. 3CN being more active; being only 40 miles from Newcastle must be hatching something. 2MR had some trouble with the Philips' No. 4 rc. At Stockton, 200 busy boat building, but has an occasional QSO on 80. 2AMM's XYL been ill; hope Betty OK again now Bill. A local b.c. station has acquired land near 2AA1 for possible v.l. tx—poor Ron! Lakesiders 2KQ and 2AFA quiet lately. As this will be my swan song, I'd like to express my gratitude to those who have assisted me in various ways. Finally, an appeal to you chaps to let the Zone Officer know what's doing so he won't have to be a super Sherlock Holmes and Hamster. Anderson 72 from 2ASJ.

Notice of Meeting.—A special lecture is being arranged for the April meeting which will be held at the 2HR Auditorium at Maitland on Friday 10th. Cars will leave usual Newcastle meeting place, Hunter Street West, at 7.15 p.m.

VICTORIA

The March meeting of the Division was held on 4/3/53 when approximately 120 members assembled to partake in a tense night. General business was quickly dealt with, leaving most of the evening available for listening.

Gear available ranged from jars of odd screws to tx's and rx's.

SLN, O.C. Tenders, kept things moving along at a merry pace, but still managed to raise plenty of laughs. Unfortunately the evening was not long enough to dispose of all the gear offering, and private sales were arranged after lock-up time.

3AFJ must have taken a taxi home, as he acquired enough bits and pieces for a major re-build. Another successful tenderer was 3AO's junior op. Just as well Eric brought the station wagon along.

Our visitor, 3JD, was asked about the tender nights held in S.A. He explained that they took part of the proceeds for their funds and it appears possible that similar steps will be taken here in future. I would like to see such proceeds car-marked for the building fund, which has just been established.

The building fund has got away to a good start, but will have to be greatly increased before positive action can be taken to acquire our own premises.

It was announced at this meeting that arrangements have now been made to resume slow morse transmissions every Sunday evening. The Station supplying the service will appreciate reports on the transmissions. If you cannot contact them direct, reports may be sent to the rooming house. I would like to pass this information along to your a.w.l. friends.

The 50 and 144 Mc. transmissions of the Sunday morning broadcasts are now transmitted simultaneously with the 7 and 3.5 Mc. transmissions. Reports should be sent direct to 3WL.

Don't know where everybody went during the long week-end, but heard very few signals on the air. 3ATW was on testing portable gear ready for Easter holidays. 3AAF playing with an inverted V, but have had no report about it yet. 3BH talking of putting a signal on 2B8. 3ATR trying Heising modulation, but doesn't sound the best Max. 3AMZ shifted to Moorabbin! Saw 2AFD's photo in evening paper recently. Fitted out with new uniform ready to take his place in the Coronation Contingent. If he was any taller he'd need guy wires. I'll go on any further I'll have to send the editor parcels of butter, eggs, etc. (and potatoes—Ed.), so till next month, cheers chaps.

NORTH EASTERN ZONE CONVENTION

Yes men, by kind favour of the editor we have the latest oil from the Annual Convention

of the North Eastern Zone, held in the Avenel Public Hall (1878) on 8th March when Jack 3PZ was elected President for the ensuing year, Rex 3UR Vice-President, and Hugh 3AHF Secretary. The Zone Correspondent was left to Andy 3FD while the Communications was handed again to the Zone Emergency, Col 3WQ and Ken 3HB. The Zone Oper Co-ordinator is Henry 3HP.

We will not deal with the individuals this time, but we would have liked to have seen, for example, John 3ACK, Howard 3TY, Alex 3AT, Tom 3TS, Les 3ALE, Chas 3ACW and Associate Jim Harrington. The trip around the D.C.A. installation at Mangalore was most interesting going over the omni-directional v.h.f. range, the 75 Mc. marker on the Lorenz range, the D.M.E. equipment and the communications installation. All wound up with an excellent cup of tea in the passenger's lounge by Mrs. D. R. Twigg, and her friends. Congrats in closing to Alan 3SQ, Doug 3JJ, and Chas 3ACW on an extra good show.

CENTRAL WESTERN ZONE

In the absence of Trev 3ATR, now holidaying in VK4, lucky blighter, your worthy scribes for this month are the Lubeck lads—3IB and 3AKW. Once again activity in this zone has been rather quiet with a lot of the boys just getting over their holidays.

3IB designed a super-duper combination 2 and 6 mc tx with v.l. and 2L, but ran out of the necessary spondonics on his holidays; looks like back to the old mod. osc. and super bopper: 3AKW running around in a spanking new car, how do you do it Bill? Might try and touch you for a loan and get that new tx finished yet!

Merv 3AFO seems to be about the only progressive member of the zone, having all his 2 mc gear in operation, but nobody to talk to! Merv is planning to move up a few rungs in the old ladder and is shortly sitting for his first class ticket, good luck to you anyway fella. Jim 3DP playing around with a 2 mc converter, keep your fingers crossed for him, you might get a contact out of Hosham yet! Bob 3ARMT still awaiting the arrival of his alternator, look out for the kilowatts when he gets it operating fellows.

Visitors to the "best broadcasting station . . ." —with apologies to a certain VK3—recently were 3ARB and 3GQ. Had to lock and chain the

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5X28 for the occasion. DX conditions seem to have deteriorated during the last month and the local DX hounds, JIB and Harold 3AX, have been finding things pretty lean, have been drowning our sorrows in the local botstery!

In conclusion, we extend a hearty invitation to all zone members to be present on our Wednesday night hook-ups at 8.30 p.m. Not just the regulars, but everyone, that means you! Don't look at me like that Bill! Seriously fellows, a low powered 80 mx rig is not hard to construct and we do like to keep in touch with you all. You'll be there? F.b. then, be seeing you.

FAR NORTH WESTERN ZONE

After many attempts to get some notes in on time I have at last managed to get around to pounding the old "mill" and hope these are in time for inclusion in April issue. The main item of interest here at the moment is the 2 mx activity by Chas 2TI. Called on Chas a few weeks ago and he was surrounded by zeccker wires, self excited oscillators and super regen rx, to say nothing about the antenna systems. He has really been stuck into it and now has graduated to a m.o.p.a. on two. So far he hasn't been heard by anyone, but has hopes of working Ian at the Mildura drone in the very near future. 3GZ has made a 4 element beam for two and has the 5CR522 rx section on the table pondering over the oscillator section which someone has been tampering with. He would be grateful if anyone would supply him with the values of cathode coil and condenser, in fact all the dope on the grid cathode part of the osc.

Last month we made a visit to Noel 3AUG at Merbein. By we, I mean 2TI, 3SN, 3AFP and 3GZ. Noel demonstrated his beam and managed to work a couple of DX stations just to prove that it worked. One thing the lads complained about was the lack of ash trays in Noel's shack. Really Noel, the floor is far too spic and span to accommodate the ashes and butts Chas, Max and Jim were depositing there. Guess we will bring a supply of ash trays next visit.

The Sunday afternoon hook-up works occasionally, but conditions or bows make us miss out on Frank 3FC in Guyen. Bill 3AJU also seems to be in the skip most Sundays. No doubt Bill is in the middle of harvesting operations now and hasn't a great deal of time for Ham Radio. Harry 3MF tells me that he is

looking his gear over and has hopes of doing something in the near future. I gather the junior op. keeps Harry busy these days. I hope that by the time next month comes around we will have some news of contacts on 2 mx.

MOORABBIN & DIS. AMATEUR RADIO CLUB

At the meeting held at the Moorabbin Town Hall Annexe on Friday evening, 20th February, movies of the annual club picnic and various hidden tx hunts, including the tx hunt at Ballarat, were shown by Bob Hall Film Productions. It was decided to inaugurate classes for members desiring study for the Amateur Operators Proficiency Certificate.

Honorary Member Certificates are still available to all transmitting Amateurs who contact members of the Moorabbin Radio Club "over the air" and who also QSO the club station, VK1AIP. The club station is in operation on the first and third Friday of each month.

GEELONG AMATEUR RADIO CLUB

Another novel tx hunt took place during February. Altogether four hunts took place at that meeting, each lasting for 20 minutes. The tx then went off for five minutes to shift location while the hunters returned to the club to start again. A point system was used which resulted in a win for Max Stock and party, while J. Barber and company and J. Beckingham tied for second place.

The second meeting of the month was a visit to the shack of Bob 3IC who had his gear arranged very neatly; it consisted of an F56, BC348 and AR8 rx's, and a CRV5233 tx. During the evening Bob had a contact with Peter 3APK. While this was going on, the boys were enjoying a buffet supper which was appreciated by the members.

QUEENSLAND

The February general meeting was very poorly attended mainly due to the rain, there being 11 full members and four students present. Being few as there were, a vote was taken whether or not to call a meeting and it was decided to carry on. It was revealed that our meeting place (I.R.E. Rooms) is no longer available to us and in future, meetings will be held in the Royal Geographical Rooms in Ann Street, opposite the Couriers, and the general meeting will be on the first Friday of the month.

The Annual General Meeting is scheduled for 8th April and the Annual Dinner on 10th April, tickets 12/6 each. It is regretted that our Class Member Mr. Tom Alder was unable to attend due to carry on. He has done a splendid job for the students. However, 4LJ will take over until the end of the season when endeavours will be made to obtain a permanent instructor.

It was suggested by 4CC that permission be sought to allow QSOs in other languages than at present, English. 4AO voiced disapproval of portion of the Qld. Divisional Notes in a recent issue. 4VJ suggested a field day be held to revive interest in Divisional activities. That about sums up the February meeting.

Conditions generally have been extremely poor at this QTR. The last entry in my log was 34th January. Apart from a local or two and the story of the divine antenna, the panoramic view and the vertical, none of the locals seem really active. We have been subjected to frequent power black outs lately and this may have had a disquieting effect. We must expect poor conditions this year, being right down in the trough of the eleven-year cycle.

The March general meeting was held on Friday 6th in the pleasant new rooms as previously mentioned, there being 20 members present. An official invitation has been received for Vets. Hens to attend the Urunga Convention 4th to 6th April inclusive—where all are promised an excellent time.

4FE, as Federal representative, outlined with the aid of maps the latest approved plan for the Emergency Net which has been gone into very thoroughly and if carried out will be a mighty weapon of assistance in an emergency. Those with equipment are requested to get together and standardise same as much as possible. The Contest Committee advises that the annual VK4 Intrastate Contest will take place from 1st to 30th April. One rule altered from last year is that consecutive QSOs between two stations on various bands is no longer permissible. Five (5) QSOs with other stations must be interspersed.

At the suggestion of one of the Downs members, some trial broadcasts of the weekly Sunday 4WI session will be in full swing by the time the 1st of May comes. The 400 and 7 Mc. broadcasts have proved unsatisfactory in certain areas due to the existing poor conditions, so 4WI will radiate simultaneously on 3.5, 7 and 14 Mc. bands. It is hoped this will improve service to country members.

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TASMANIA

The drought has broken in the new line in VK6, but methinks it has broken too late—and as usual the drought-breakers are the same old "old faithfuls" only. Manjimup activity is as an all-time low. Mac has been in the area for the Ham bands. Alec for various reasons, Mac apparently QRL with the local b.c. sets GMRG has taken up abode in a local "fixer-upper" and has given up the "pursuit" award. The thought occurred people got Government jobs they never forsook 'em! Sorry to hear the XYL was sick at time of writing. Alec: hope the good lady is OK now and that the fish bit well during the drought. Spoke of:

6FL is another to report "nothing doing." Frank has a new shack and by the time these notes appear may have the power on. He says that as soon as the DX begins poking its head up, he'll be back! 6GA while on vacation spent a week-end in Geraldton and he and you scribe nattered furiously on Ham Radio for the entire week-end. Bill has since written me a short note to say he returned safely to Forrest per camel train or mule team or something and will be active again on 7 Mc.

6WR is active occasionally with a low-power rig which puts out a surprisingly solid signal. 6CN has made an appearance now and then, too and has been covered by Kellereberrin by name of Arnold. One of the local Hollywood glamour factory gals' nuts about t.v. and was at Cyril's 40th recently when a QSO resulted with 6EC. The 40 mx band was thick with sync. pulses, line scans, blanking pulses and similar high-brow lingo. 6AV and 6AG were strangers who popped up on 7 Mc. during recent weeks to surprise the inhabitants.

A recent "whinge" of mine to the Perth headquarters of this Division that these notes were starving for lack of information from members brought forth some rather peculiar logic. Country members who, like myself, do not get the opportunity of mingling with hundreds (I was not sure) of members at meetings, will be interested to learn that members have been vexed the view that the notes were of little interest by the time they were printed because of the time lag. Of course VK6 is the only Division required to get its notes to the Editor by the 8th of the month. I am sure, however, if they are not of interest they are not worth reading; if they are not worth reading, they are not worth writing—so ta-ta!

6890ms. 6ACZ we learned the following: The highlight for the month was the annual picnic held on 22nd February last at Rockingham. It was nearly a full day affair and almost fifty members and their families were present. We decided to forgo any radio stunts or contests although the nearest approach was a quiz that had a couple of questions pertaining to the radio. The picnic was a get together with the old and new Hams to get together with no visible signs of radio equipment. (Bar groups of heads together for fairly long periods while the radio was being used by the one or two typist family.) At previous picnics some carried a "wireless" radio picnic basket to give the radio a little more attention. (Poor marks go to George 6CH for his organisation, and his two henchmen, 6AZ and 6DJ, who did the actual work. The outing was voted distinct success.)

The February general meeting, after the conclusion of business, was entertained with a working demonstration of the automatic radio compass, with all its frills, by the President, G. G. and the description mainly by block diagrams was given by Mr. H. Gaubert. He outlined some of the points needed in practice when the equipment was installed on a plane. The audience moved a hearty vote of thanks to the lecturer and demonstrator.

Plans are in hand for the exhibition of the R.D. Trophy in a city shop window during March, accompanied by items of interest from various members. The Institute is fortunate in obtaining the full space of a leading store for a week, and no opportunity will be lost in bringing before the public what Ham Radio is, and does. All the trophies held by members will also be gathered together. The Radio

VK6s, with its comparatively few Hams, can ill afford to lose two. 6JC and 6HM have gone to reside on Cocos Island. Their calls are VK1JC and VK1HM, the latter is a regular worker on 14 Mc. and contemplates setting up his 144 Mc. gear.

Night activity has been almost nil for the 7 and 14 Mc. bands for the past month, and most of the contacts made are at week-ends.

6WI continues to radiate Institute news in the capable hands of 6GH. His selection of items for the monthly technical talk is always a valuable one and much appreciated.

The most important happening for this month was of course the Annual General Meeting which was held on Saturday, 28th February, at the Photographic Society Rooms with 36 members present. The Northern Zone was represented by Len TBQ and Col TIZ who arrived with a high wind as a rather heavy rain squall and bursting with the news that the 14th MC band had opened to VK3 a few days previously, resulting in a number of QSOs from the home locations. Congrats fellows, I am so too wasn't it! From the N.W. Zone came Ian TKB (with two junior ops.) and Associate Bob TBA. The meeting opened at 1.15 hours when after the usual preliminaries the following officers were elected for the coming 12 months:

Patron, L. Crooks, TBQ; QSL Officers: T. Allen, TAL and R. Calvert, TRT; Broadcast Officer, T. Allen; Traffic Officer, R. O'May, TOB (the actually asked for IT); Auditors, G. Richardson, TGR, and A. Finch, TCJ; Suck—er—er, Publicity, T. Allen, TAL; Finance, J. C. Angles, Tiny; V.h.f. Officer, A. Johnson, TAJ. Two new faces, TBJ and TRT will appear on the Council for the coming year, the balladists, T. Jones, TJN, and T. Alst, TAL, and TLE. The presentation of the President's and Treasurer's reports showed that the Division had quite a successful year with the bank balance in a very good condition and membership up 80 per cent.

The meeting closed at approx. 7 p.m. and those present adjourned to Ellerslie House for the Annual Dinner. A total of 36 members and guests were present, the Wireless Branch being represented by the Superintendent, Mr. E. Dunne, and the professional radio men by Mr. T. Weeks, O.I.C. of V.H. A good feed was had by all—in some cases two good feeds—perhaps that was the reason for the gigantic “hiccup” from one of 7KB’s harmonics during one of the speeches—before the bung was out too!

A highlight of the occasion was the presentation by the President of special life membership certificates to TBJ, TBQ and TLJ, the certificate for "Snowy" TCH was held for another occasion owing to his absence.

We have been very fortunate in procuring a large room in the city for Institute clubs—the room is very centrally situated—50 Liverpool Street and is quite large—50 ft. by approx. 16 ft. It will make excellent club rooms with plenty of space for meetings and work, and a large open end, that will allow the success of the venture depends mainly on the support it receives from city members, and working bees will be organised from time to time to get the place in order, etc., so don't be backward in coming forward to lend a hand and 'give' your share to the few Council members to do all the work.

Tiny JD, who has been doing such a good job writing the notes for the magazine during the past year, has moved location to the QRN area at Glenorchy. He tells me that he will be taking the air this month—yes—ha, ha, wonder already he's contemplating a 32 tube rx. Bob 7AF also moving into the QRN area. Battery Point and disposing of the tower and rotary, but he assures me he won't be off long. Haven't heard you for some time anyway. Bob

Latest additions to Ham families this month are a daughter to Max TML and a son to Ben 7BC. Seems that both XYLs were in adjacent hospital beds and didn't know it until their respective fathers happened to be in phase during visiting hours.

How's this for luck. Bill TAK went mountain-touring a while back and barked his shin on a quartz crystal big as a football. He weighed about 28 lbs. according to rumour and 100 per cent. active too, now what about this s.s.s.c. rig Bill, it's about time we heard some sort of sound from Flinders Island. Chas, ex-Flinders Island, says he's coming home and will be looking for 4 Mc. VKT contacts from Port Moresby when he returns in April. Chas has an extension on a nearby telephone pole supporting one end of the bit of wire—says it works all right too except that the bloke next door complains of sizzling noises coming from his telephone mouthpiece! Or did I get it wrong Chas?

NORTHERN TASMANIAN ZONE

The great news in February was the 144 MHz break through between Tasmania and Victoria. VKs 7LZ, 7BQ, 7PF and 7GM being the successful ones in Launceston.

As this is written just before the annual zone meeting, the results of the closely contested elections for office-bearers are not known but the fight for honours is expected to be keen.

By the way, a very interesting lecture is one of the books for April. Mr. T. K. Jebb has kindly consented to tell us about his recent trip to Britain and the Continent and it should be of

absorbing interest to all members. It is the second Friday in April at the Technical College.

For the following month, TXW has promised to unvell some of the mysteries of remote control as applied to b.c. station working. If any member has any ideas for future lectures, speak up and let the committee know.

We always knew that in recent months radio communications with the south were bad, so the Hobart suggestion to use smoke signals appears to be worth looking into. Wouldn't it be terrible if the lads worked smoke signals between Mt. Barrow and Mt. Wellington, and 144 Mc. folded up between these points.

HAMADS

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Advertisements under this heading will only be accepted from Institute Members who desire to dispose of equipment which is their own personal property. Copy must be received by 8th of the month, and remittance must accompany advertisement. Calculation of cost is based on an average of six words a line. Dealers' advertisements not accepted in this column.

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FOR SALE—1 SCR522 Tx and Rx complete; 2 Command Transmitters, 7 Mc.; 1 R.C.A. AR7 Receiver, 540 Kc. to 31 Mc., 10 tubes, 1 Hammarlund Super Pro Receiver, 19 tubes, 1 Eddystone 50 Mc. Transmitter, 5 stages, final #15; 1 Eddystone 50 Mc. Converter in cabinet, not complete; 1 A.W.A. Modulated Oscillator, Type J6728; 1 AR301 144 Mc. Receiver; 1 AT5 Transmitter, converted for 6 volt filament operation; 1 TA12B Transmitter, converted except for finals. R. Pike, Castle-reach Street, Connaible, N.S.W.

SELL.—All my gear. Must clear owing to new small QRA. This is dinkum—gear at give-away prices. Offer basis until 3 p.m. Auction following Easter Sunday—all day. H. Kinnear, Cr. Barnard and Yar-Orrong Rds., Toorak (off Toorak Rd.). Phone UY 6090.

SELL.—Beam aerial tower with feeds for two beams, 28v. motor and reduction gears, £14/10/-. Also 40 ft. organ mast and insulated guys, £3/10/-. Must sell. H. Webber, 567 Punt Road, South Yarra, Vic.

SELL—SCR522 rack and panel, partly converted, xtal and meter. £17 or best offer. J. Endacott, 24 Cumming Street, West Brunswick, Vic.

SELL—See advt. March issue of "A.R." Some items remain: 829B, 835U4 and other tubes, Tx Tuning Conds., Eddystone S640 Rx, some Meters, 1,100 volt Trans., etc. No reasonable offer refused to clear gear. Also A.C. operated 300 ohm and 70 ohm co-axial change-over relays, 3 $\frac{1}{2}$ " Spkr., 6v. and 12v. Vibrator Supplies, Power Transformers. Ring UY 6256. K. McTaggart, 4 Kenilworth Gr. Glen Iris. S.E.6, Vic.

SELL—Standard 5 ft. Rack, £1; complete Var. Pitch 12v. Prop. Motor and two 50v. Selsyn Motors, £7/10-12; ASB7 V.H.F. 515 Mc. Receiver, complete with 446B Lighthouse valve, R.F. Amp. and all other valves, unmodified, £12; TR1143 V.H.F. Tx-Rx, 100-124 Mc., 20 valves, £10. E. Manifold, 267 Jasper Road, McKinnon, S.E.14, Vic.

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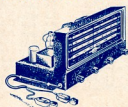
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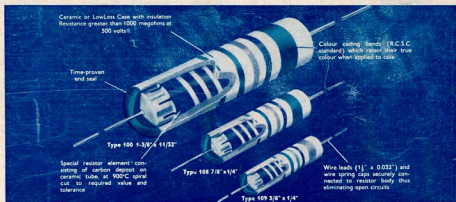
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Brown ... 1	Blue ... 6
Red ... 2	Violet ... 7
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If a fourth band is added on resistors, it indicates the tolerance according to the following code:—

Gold, $\pm 5\%$ tolerance;
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If the fourth metallic indication is absent, the tolerance is assumed to be 20%.

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1. Red, Violet, Orange, Silver—27,000 ohms $\pm 10\%$.
2. Yellow, Violet, Black, Gold—47 ohms $\pm 5\%$.
3. Blue, Grey, Brown—680 ohms $\pm 20\%$.

INTERNATIONAL PREFERRED VALUES (10% Tolerance)

The following table lists the standard resistor values in ohms, comprising the 10% Tolerance Range. Each resistor covers values within $\pm 10\%$ of its nominal value.

Prev. V. Res. Range	Prev. Val. Res. Range	Prev. Value	Res. Range	Prev. Value	Res. Range
10 — 10-11	330 — 297-363	10,000 —	9,000-11,000	330,000 —	297,000-363,000
12 — 11-13	390 — 351-429	12,000 —	10,800-13,200	390,000 —	351,000-429,000
15 — 14-16	470 — 423-517	15,000 —	13,500-16,500	470,000 —	423,000-517,000
18 — 17-19	560 — 504-616	18,000 —	16,200-19,800	560,000 —	504,000-616,000
22 — 20-24	680 — 612-748	22,000 —	19,800-24,200	680,000 —	612,000-748,000
27 — 25-30	820 — 738-902	27,000 —	24,300-29,700	820,000 —	738,000-902,000
33 — 30-36	1,000 — 900-1,100	33,000 —	29,700-36,300	1.0 meg.	0.9-1.1 meg.
39 — 36-42	1,200 — 1,080-1,320	39,000 —	35,100-42,900	1.2 meg.	1.08-1.32 meg.
47 — 43-51	1,500 — 1,350-1,650	47,000 —	42,300-51,700	1.5 meg.	1.35-1.65 meg.
56 — 52-61	1,800 — 1,620-1,980	56,000 —	50,400-61,600	1.8 meg.	1.62-1.98 meg.
68 — 62-74	2,200 — 1,980-2,420	68,000 —	61,200-74,800	2.2 meg.	1.98-2.42 meg.
82 — 74-90	2,700 — 2,430-2,970	82,000 —	73,800-90,200	2.7 meg.	2.43-2.97 meg.
100 — 90-110	3,300 — 2,970-3,630	100,000 —	90,000-110,000	3.3 meg.	2.97-3.63 meg.
120 — 108-132	3,900 — 3,510-4,290	120,000 —	108,000-132,000	3.9 meg.	3.51-4.29 meg.
150 — 135-165	4,700 — 4,230-5,170	150,000 —	135,000-165,000	4.7 meg.	4.23-5.17 meg.
180 — 162-198	5,600 — 5,040-6,160	180,000 —	162,000-198,000	5.6 meg.	5.04-6.16 meg.
220 — 198-242	6,800 — 6,120-7,480	220,000 —	198,000-242,000	6.8 meg.	6.12-7.48 meg.
270 — 243-297	8,200 — 7,380-9,020	270,000 —	243,000-297,000	8.2 meg.	7.38-9.02 meg.

INTERNATIONAL PREFERRED VALUES (20% Tolerance)

Prev. V. Res. Range	Prev. Val. Res. Range	Prev. Value	Res. Range	Prev. Value	Res. Range
10 — 10-12	330 — 264-396	10,000 —	8,000-12,000	470,000 —	376,000-564,000
15 — 12-18	470 — 376-584	15,000 —	12,000-18,000	680,000 —	544,000-816,000
22 — 18-26	680 — 544-820	22,000 —	17,600-26,400	1.0 meg.	0.80-1.20 meg.
33 — 27-39	1,000 — 800-1,200	33,000 —	26,400-39,600	1.5 meg.	1.20-1.80 meg.
47 — 38-56	1,500 — 1,200-1,800	47,000 —	37,600-56,400	2.2 meg.	1.76-2.64 meg.
68 — 55-81	2,200 — 1,760-2,640	68,000 —	54,400-81,600	3.3 meg.	2.64-3.96 meg.
100 — 80-120	3,300 — 2,640-3,960	100,000 —	80,000-120,000	4.7 meg.	3.76-5.64 meg.
150 — 120-180	4,700 — 3,760-5,640	150,000 —	120,000-180,000	6.8 meg.	5.44-8.16 meg.
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